RADIAN
CORPORATION

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PROPOSED REVISIONS OF PSD PERMIT NUMBER PSD-X82-01 FOR SOURCES TO BE ADDED TO THE KUPARUK RIVER UNIT, KUPARUK, ALASKA

Submitted by:
Arco Alaska, Inc.

Submitted to:
U. S. Environmental Protection Agency Region X
and
State of Alaska
Department of Environmental Conservation

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EXECUTIVE SUMMARY

In April 1981, Arco Alaska, Incorporated (Arco) submitted a permit application to the United States Environmental Protection Agency (USEPA) Region X to construct facilities at the Kuparuk, Alaska Oil Field in accordance with the requirement of USEPA's Prevention of Significant Deterioration (PSD) regulations which were promulgated August 7, 1980. The timing for submission of the permit application was dictated, in part, by Arco's production schedule, which required an expeditious start on construction of the facilities.

In order to prepare the PSD permit application for a timely review by USEPA Region X, the facilities design had to be based on preliminary information, which constituted the best information available at that time. Since submittal of the original application an updated facilities design has become available.

This document describes the revisions requested for PSD Permit No. PSD-X82-01, incorporating all design changes currently anticipated to occur through construction of these facilities. Under the PSD regulations, the modified Kuparuk River Unit facilities will continue to be a major source of emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter (PM), volatile organic compounds (VOC), and carbon monoxide (CO).

Because there was a possibility that a refined engineering analysis might result in a number of facility design changes, the analysis for the originally proposed facilities was conservative in identifying air quality impacts. Emissions estimates resulting from the revised facilities design are equal or less than overall emissions for all the pollutants addressed in the original permit application.

Air quality impacts associated with the modified facilities do not differ significantly from the impacts presented in the original permit application. Operation of the facilities as proposed in this revised permit application is not predicted to cause or contribute to air pollution in violation of any national ambient air quality standard or any PSD increment. Estimated emission levels for each of the pollutants based on the revised design are less than the levels identified in the original application, and Best Available Control Technology (BACT) is applied for the pollutants as discussed in the original application. In addition, it is not anticipated that the modified facilities will result in any change to the analyses already conducted for impacts of induced growth, soils, vegetation, or visibility.

3.0 BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Design refinements in the Kuparuk River Unit result in minimal changes to the emissions from the facilities. Since there have been no increases in the level of emissions, the types of emitting sources, or other factors which might affect the choice of emission control technology, the emission controls proposed in the original permit application still represent BACT. For comparison, both the total potential emissions for the original permit application and the revised total potential emissions are shown in Table 3-1.

In the interest of clarity, the emission controls proposed as BACT are repeated here. The discussion of alternative controls and justification of the proposed BACT can be found in the original permit application.

3.1 Proposed Controls Representing BACT

An analysis has been performed to determine BACT for the proposed facilities in a manner consistent with national and EPA Region X guidelines. The two major types of emitting sources are gas turbines and heaters. While these combustion sources emit significant amounts of particulate matter (PM), sulfur dioxide (SO_2), carbon monoxide (CO), and hydrocarbons (HC), the pollutants of greatest concern are the oxides of nitrogen (NO_x). BACT for gas turbines and heaters was determined according to the precedents set in the Unit Owner's PWI/LPS/AL and Waterflood permits (Permit Nos. PSD-X-80-09 and PSD-X-81-01). The controls proposed as BACT are summarized below:

TABLE 3-1

PROPOSED REVISED NET EMISSIONS INCREASES AND SIGNIFICANT LEVELS FOR KUPARUK RIVER UNIT SOURCES

Pollutant	Permitted Net Emissions Increase (t/y)	Revised Net Emissions Increase (t/y)	Significant Level (t/y)
CO	2,964	2,789	100
NO_x	15,226	14,122	40
SO_2	86	85	40
PM	380	344	25
VOC	53	51	40*

*VOC (Volatile organic compound) emissions were conservatively assumed to be 10 percent of total hydrocarbon emissions.

Turbines

NO_x emissions from the gas turbines are controlled by use of natural gas and dry controls incorporated into the combustion chamber design. This combination will meet the NSPS[1] limit of 150 x (14.4/Y) ppmv of NO_x in the exhaust and should be considered BACT. Other pollutants from the gas turbines are also limited by the choice of fuel (low sulfur, low ash).

Heaters

The NO_x emissions from heaters will be minimized by burning natural gas. This fuel choice also limits emissions of SO_2 and PM since natural gas contains very little sulfur and ash forming material. The emissions of all pollutants will be limited by periodic measurements of CO or O_2 in the flue gas to insure proper combustion conditions.

Other Facilities

In addition to the major emission sources (turbines and heaters), a multiple chamber refuse incinerator is included in the revised facility. The incinerator will combust about 765 pounds per hour of general refuse. The combination of adequate additional air and combustion temperature, a properly designed mixing chamber, and/or secondary burners will be used to minimize emissions. No additional controls are proposed as BACT for the incinerator.

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[1]New Source Performance Standard, Standards of Performance for Stationary Gas Turbines, Subpart GG, September 10, 1979. Y = manufacturer's heat rate at manufacturer's rated load.

Besides the combustion-related emissions, there will be fugitive hydrocarbon emissions from process equipment. The process fugitive emissions will be minimized.